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THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

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The Alberta Journal of Educational Research

THE COMMITTEE ON EDUCATIONAL RESEARCH

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A STUDY OF MATRICULATION IN ALBERTA

A. B. Evenson and D. E. Smith

Introduction:

The following progress report of the Matriculation Study Sub-committee is the third to appear in this Journal. The first report appeared in the June 1957 issue of the Alberta Journal of Educational research, and the second, by S. C. T. Clarke, appeared in the March 1958 issue. Prediction studies are continuing with the application of more elaborate statistical analyses. Results should be interesting and should supply answers to some questions that have been raised. Following the completion of this work, the sub-committee findings will be published in a fourth report. At the meeting of the High School Curriculum Committee held on April 22 - 23, 1954, a motion was passed recommending "that the Articulation Committee set up an appropriate committee to study the validity of the present system of selecting students for university education and to explore the merits of alternative systems". This motion was considered by the Joint Committee to coordinate University and High School Curricula (the So-called Articulation Committee) at its meeting on June 18th, 1954, and it was agreed that a special committee should be set up for this purpose.

As a consequence, the Joint Committee on December 8th, 1954, set up the Matriculation Study Sub-Committee with the following personnel: A. B. Evenson, Professor D. E. Smith, (these two named as co-chairmen), Professor S. C. T. Clarke, Mr. M. J. V. Downey, Mr. H. R. Hawes and Dr. G. L. Mowat (replaced in 1956 by Dr. T. C. Byrne). It was agreed that this sub-committee should have the following terms of reference:

1. Test the validity of Grade IX examinations and other tests as a measure of success in (a) the senior high school and (b) university;
2. Test the validity of Grade XII examinations as a measure of success in university;
3. Test the validity of success in non-academic subjects as a measure of success in university;
4. Study the experience of other universities in testing other types of matriculation regulations.

Planning the Study:

The Matriculation Study Sub-Committee sought and obtained approval in principle for two projects. The first of these was a study of the Freshman class of 1951 at the University of Alberta; it

involved a statistical analysis of high school and university marks and of scores on any standardized tests the students had taken. The second study was carried on with Grade XII students in 1956; it was concerned with the performance of Alberta students on the College Entrance Examination Board (C.E.E.B.) tests as used in the United States, as well as with marks on local examinations. Details of these projects were given in an article by Evenson and Smith.[1]

Some funds were available in the beginning for clerical assistance; but the larger amounts required for a full time research program could not be obtained. The sub-committee thus has been forced continually to revise its plans and reconsider priorities in its work.

The 1951 *Freshman Study*

The standing of students on Grade IX examinations, including both the average standing in the subject field and the scores on the general (intelligence) test, have been compared with university marks for the 1951 freshman group generally. These comparisons have been made not only with the first year averages at university, but also with averages in the final year. Similarly, average standing in Grade XII and the scores made on the American Council on Education's Psychological Examination (A.E.C.) Test (given at

TABLE I

COEFFICIENTS OF CORRELATION (r) BETWEEN GRADE IX RESULTS AND UNIVERSITY MARKS OF 1951 FRESHMEN

Correlated with:	Grade IX Average		Grade IX General Test	
	r	No. Cases	r	No. Cases
First Year University Average	0.40	647	0.14	640
Final Year University Average (Students graduating in 3 years)	0.42	117	0.16	116
Final Year University Average (Students graduating in 4 years*)	0.25	152	0.15	151

*Students graduating in 4 years include: (a) Students graduating in normal time in a 4-year course; (b) Students in a 3-year course who, by reason of failure, transfer, illness, etc. required an extra year before graduating.

[1] A. B. Evenson and D. E. Smith, "A Study of Matriculation in Alberta", **The Journal of Education Research** 1957; Volume III; pp. 62-71.

the university by Student Advisory Services) have been compared with university averages in first and later years. First year marks at the University have been compared with marks in subsequent years. The details of these comparisons are given in Tables I, II, III and IV:

TABLE II

COEFFICIENTS OF CORRELATION (r) BETWEEN GRADE XII STANDING OR A.C.E. SCORES AND UNIVERSITY MARKS OF 1951 FRESHMEN

Correlated with:	Grade XII Average		A.C.E. Score	
	r	No. Cases	r	No. Cases
First Year University Average	0.48	881	0.36	523
Second Year University Average	0.54	478	0.16	350
Final Year University Average (Students graduating in 3 years)	0.36	170	0.15	116
Final Year University Average (Students graduating in 4 years*)	0.50	191	0.18	136

*Students graduating in 4 years include: (a) Students graduating in normal time in a 4-year course; (b) Students in a 3-year course, who, by reason of failure, transfer, illness, etc. required an extra year before graduating.

TABLE III

COEFFICIENTS OF CORRELATION (r) BETWEEN FIRST-YEAR UNIVERSITY MARKS AND GRADE XII STANDING OR A.C.E. SCORES FOR SOME REPRESENTATIVE FACULTIES

First Year Average in:	Grade XII Average		A.C.E. Score	
	r	No. Cases	r	No. Cases
Arts and Science	0.58	234	0.34	174
Engineering	0.59	121	0.26	123
Education (B.Ed.)	0.54	124	.....	.....

TABLE IV

COEFFICIENTS OF CORRELATION (r) BETWEEN FIRST YEAR MARKS AT UNIVERTISY AND MARKS IN LATER YEARS

First Year Average with:	r	No. Cases
Second year University Average	0.63	510
Final Year University Average (Students graduating in 3 years)	0.45	181
Final Year University Average (Students graduating in 4 years*)	0.47	199

*Students graduating in 4 years include: (a) Students graduating in normal time in a 4-year course; (b) Students in a 3-year course, who by reason of failure, transfer, illness, etc. require an extra year before graduating.

The highest correlations are to be found between marks in academic subjects in high schools and university marks. Thus, the correlations between the Grade XII average and university marks are higher than correlations between the A.C.E. scores and university marks. This tendency seems uniform in two representative large faculties. Similarly, correlations between the Grade IX average on subject examinations and the university marks, though lower than in the case of Grade XII averages, are higher than correlations between the Grade IX General Test scores and university marks. There is some tendency, with many exceptions, for correlations between these predictors and first year university averages to be higher than correlations with university marks in later years. Fairly high correlations are found between the first year university average and the average of university marks in later years.

The findings so far indicate that the best single predictor of success at the University of Alberta is the Grade XII average. There is no evidence from this study that the A.C.E. test might be used as a substitute for present matriculation requirements.[2] Promotion into later years is now based upon the students' performance in the first year; these data would seem to support this practice. These findings are subject to confirmation, or otherwise, in later phases of the study.

The average marks in Grade XII and in first year university, for students who withdrew from degree programs in a few represent-

[2]The A.C.E. is not used as part of the admission procedures at the University of Alberta; it is administered after the student is registered for the first time, in order to assist counselling activities. The data reported here have no bearing on the validity of the A.C.E. for counselling purposes after admission.

ative faculties, are shown in Table V. As a basis of comparison, the average marks in Grade XII and the first year university, separately for all students in degree programs in all faculties, have also been calculated and are shown in Table VI.

TABLE V

HIGH SCHOOL AND UNIVERSITY STANDING OF 1951 FRESHMAN IN DEGREE PROGRAMS WHO WITHDREW AT THE END OF FIRST YEAR. SEPARATELY FOR SOME REPRESENTATIVE FACULTIES AND SCHOOLS

Faculty	Grade XII			First Year University		
	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases
Arts & Science	66.8	8.1	44	51.0	13.7	50
Commerce	60.0	2.8	7	43.8	5.2	6
Education (B.Ed.)	57.9	3.9	17	53.7	10.2	17
Engineering	66.7	7.6	33	47.6	10.9	36

TABLE VI

HIGH SCHOOL AND FIRST YEAR UNIVERSITY STANDING OF 1951 FRESHMEN GENERALLY. SEPARATELY FOR FACULTIES AND SCHOOLS

Faculty	Grade XII			First Year University		
	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases
Agriculture	63.4	4.6	14	63.8	8.1	20
Arts & Science	68.7	7.8	236	61.1	11.6	255
Commerce	66.0	7.4	29	61.8	11.6	32
Household Economics	67.7	6.7	20	64.0	8.4	21
Education (B.Ed.)	63.0	9.1	124	62.3	7.9	129
Engineering	68.3	7.3	121	57.4	11.4	125
Nursing	71.0	7.1	23	64.4	6.9	23
Pharmacy	62.5	4.0	27	60.1	3.3	30

The drop-out rate at the University is large. It is complicated by the fact that almost all students registered in the one year Temporary License Program in Education (now called the Junior E Program) left the University at the end of that year; and some allowance should be made for the fact that students in the Bachelor of Education program often obtain a teaching certificate at the end of the second year, and begin their careers at that time. It is generally estimated that 15% of students in degree programs withdraw at the end of the first year; and many others in later years withdraw before receiving any kind of formal qualification.

Analysis of the records of 1951 Freshmen who withdraw at the end of the first year (excluding eight in small faculties) indicates that their averages at university were, on the whole, lower than those of the group generally, and lower than their averages had been in grade school. The variation of individual scores from the mean (indicated by the standard deviation) shows that many students with good academic standing must have left the university; and some others must have had considerably lower marks at university than they had obtained in Grade XII. The Sub-committee has no data which would explain these withdrawals.

The 1956 Grade XII Study

The scores of Alberta students on the C.E.E.B. Tests have been compared with the norms, which were based on the performance of students in the United States who took these tests to seek admission to universities and colleges. An analysis of the scores of the total Alberta sample was prepared by Educational Testing Service[5]; Alberta students have made a disproportionately large number of low scores, and their mean scores were much lower than those of the norm group. The report from Educational Testing Service recognized the fact that scores of a cross-section of Alberta Grade XII students could not properly be compared with scores of a select group of U.S. students who were applying for admission to colleges and universities.

It was possible later to obtain the names of students who had applied for admission to the University of Alberta in 1956; this group is reasonably comparable with the U.S. student group. An analysis of the scores of these applicants on the C.E.E.B. test has been made. A study of these scores in relation to the U.S. norms is the only valid basis for such a comparison; the scores of the total Alberta sample are retained nevertheless for general information. Coefficients of correlation have been calculated between scores on the Grade XII examinations and on the corresponding

[5]The Sub-committee wishes to record its gratitude to Educational Testing Service for this valuable contribution to the study.

C.E.E.B. subject achievement tests. All these details are presented in Tables VII and VIII.

TABLE VII

COMPARISONS OF SCORES ON VARIOUS C.E.E.B. TESTS OF THE TOTAL ALBERTA SAMPLE, U.S. STUDENTS, AND APPLICANTS FOR ADMISSION TO THE UNIVERSITY OF ALBERTA

Test	C.E.E.B. Results (Standard Scores)*								
	Total Alberta Sample			U.S. Students‡			Applicants to U.of A.		
	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases
S.A.T.—Verbal	403	87	5,797	482	106†	44,688	478	88	826
S.A.T.—Mathematical	480	95	5,797	502	106†	44,679	575	87	825
Advanced Mathematics	526	72	880	558	93†	1,510	562	64	362
Intermediate Mathematics	482	78	1,236	526	95†	3,379	542	87	212
Physics	458	78	1,223	529	107†	1,401	498	82	283
Chemistry	434	81	1,267	495	109†	1,849	493	81	238
Biology	411	75	1,253	475	100†	1,262	470	80	103
English	411	101	1,273	501	160	2,717	498	100	168
French	356	68	1,203	441	107†	1,562	371	46	173

*Scores on the C.E.E.B. tests are reported on a standard scale, in which the range of scores is 200 - 800, with a mean of 500 and a standard deviation of 100.

‡Students in the United States who take the C.E.E.B. tests are, for the most part, applicants for admission to universities. Applicants to the University of Alberta represent, therefore, the group most nearly comparable to them.

†Standard deviations indicate much greater variation in scores of individual U.S. students than in those of comparable Alberta students.

TABLE VIII

COEFFICIENTS OF CORRELATION (r) BETWEEN SCORES ON GRADE XII AND CORRESPONDING C.E.E.B. EXAMINATIONS

Tests	r	No. Cases
Math. 31* and C.E.E.B. Adv. Math.	0.58	811
Math. 30 and C.E.E.B. Inter. Math.	0.73	1,168
Physics 30 and C.E.E.B. Physics	0.69	1,179
Chemistry 30 and C.E.E.B. Chemistry	0.77	1,212
Biology 30 and C.E.E.B. Biology	0.75	1,209
English 30 and C.E.E.B. English	0.71	1,230
French 30 and C.E.E.B. French	0.60‡	1,138

*Scores on this subject are derived from examinations set by individual teachers rather than from Departmental Examinations.

‡Because of the distribution of scores of Alberta students on the C.E.E.B. Test. this correlation is suspect.

When we compare an appropriate group of Alberta Grade XII students with the U.S. norms, we find that their performance on the C.E.E.B. is close to that of the U.S. students. The variation in their scores, as indicated by the standard deviation, is smaller; they do not make very high scores, nor do they make very low ones. Their mean scores are significantly higher on the S.A.T. Mathematics test and the Intermediate Mathematics test, and significantly lower on the Physics test and the French test. The other differences between mean scores are not statistically significant. The correlations show a high degree of correspondence between scores on the C.E.E.B. tests and on the Grade XII examinations. It would appear that, with the exception of French tests, the two sets of examinations are measuring similar knowledge and skills at approximately the same level of performance.

There is no average or overall score on the C.E.E.B. tests. It was necessary, therefore, to calculate the coefficient of correlation between each individual ability or subject achievement test and the average mark of students in first year at the university. Similar correlations were calculated with the S.C.A.T. test.[4] In order to obtain comparable data, correlation coefficients are calculated be-

[4]The School and College Ability Test is a standardized test of intelligence or scholastic aptitude, available at five levels of educational experience. S.C.A.T., Level 1, is comparable to the A.C.E. test used in the 1951 Freshmen Study.

tween individual Grade XII examinations and the first year average. These data are presented in Tables IX, X and XI. Once more, the Grade XII examination of the Province of Alberta is seen to be the best individual predictor of success at the University of Alberta. Correlations obtained between Grade XII examinations and average marks at university are higher than those generally found in other studies of achievement test scores. The results obtained in Alberta with the C.E.E.B. tests, on the other hand, are comparable to those obtained on other studies.

TABLE IX

COEFFICIENTS OF CORRELATION (r) BETWEEN SCORES ON C.E.E.B. EXAMINATIONS AND FIRST YEAR UNIVERSITY AVERAGE

C.E.E.B Test	r	No. Cases
S.A.T.—V	0.27	660
S.A.T.—M	0.30	659
Adv. Math.	0.41*	298
Inter. Math.	0.34*	178
Physics	0.38*	235
Chemistry	0.38*	182
Biology	0.26*	67
English	0.20*	136
French	0.29*	140

*Comparison groups differ for each of these correlations, hence comparison between correlations must be made with caution.

TABLE X

COEFFICIENTS OF CORRELATION (r) BETWEEN SCORES ON SCAT TESTS AND FIRST YEAR UNIVERSITY AVERAGE

Test	r	No. Cases
SCAT—V	0.21	616
SCAT—Q	0.27	616
SCAT—T	0.29	616

TABLE XI

COEFFICIENTS OF CORRELATION (r) BETWEEN SCORES ON GRADE XII FINAL EXAMINATIONS AND FIRST YEAR UNIVERSITY AVERAGE, OF 1956 GRADE XII STUDENTS

Grade XII Exam	r	No. Cases
Mathematics 31	0.56*	316
Mathematics 30	0.45*	609
Physics 30	0.58*	484
Chemistry 30	0.56*	614
Biology 32	0.42*	181
English 30	0.24*	613
French 30	0.43*	519

*Comparison groups differ for each of these correlations, hence comparison between correlations must be made with caution.

Ratings given by principals, together with records of subsequent status of students after the Grade XII examinations, provide much supplementary information. Some of this does not bear directly on the terms of reference of the Sub-committee; but it was thought that analysis of some of these details might prove useful. Some of these comparisons throw more light on the validity of the C.E.E.B tests for use with Alberta students. The validity of principals' ratings can also be studied. Some of the other data provides information on the supply of students of high ability in Alberta, and the extent to which students attend university.

Scores on various C.E.E.B. tests of ability and achievement have been analyzed in relation to students' plans in May 1956, and to their status in September 1956, as matriculants who entered the University of Alberta, matriculants who did not enter this University, and non-matriculants. An analysis was made of the distribution of scores on ability tests for students of this group who entered university in September 1956. Further analysis has been made of the extent to which students of high ability entered the university in that year. The results are shown in Tables XII, XIII, XIV, XV and XVI.

TABLE XII

DISTRIBUTIONS OF SAT-VERBAL SCORES ACCORDING TO STUDENTS' PLANS FOR ATTENDANCE AT UNIVERSITY

Standard Score	Plans* to attend University		
	Yes	Undecided	No
700 and over	2	1	.....
600 - 699	147	22	21
500 - 599	434	130	134
400 - 499	822	400	481
300 - 399	786	756	1,085
Under 300	92	169	259
No score given	5	2	7
Total	2,288	1,480	1,987

*Answers to question 18 on Student Questionnaire: "Do you plan to attend University?"

TABLE XIII

DISTRIBUTIONS OF SAT-MATHEMATICAL SCORES ACCORDING TO STUDENTS' PLANS FOR ATTENDANCE AT UNIVERSITY

Standard Score	Plans* to attend University		
	Yes	Undecided	No
700 and over	71	9	4
600 - 699	495	148	86
500 - 599	726	375	324
400 - 499	735	607	800
300 - 399	254	336	766
Under 300	.....	.....	.....
No score given	7	5	7
Total	2,288	1,480	1,987

*Answers to question 18 on Student Questionnaire: "Do you plan to attend University?"

TABLE XIV

COMPARISONS OF SCORES ON VARIOUS C.E.E.B. TESTS OF MATRICULATED AND NON-MATRICULATED ALBERTA STUDENTS

Test	C.E.E.B. Results (Standard Scores)								
	Matriculants						Non-Matriculants		
	Entered U. of A.			Did not Enter U. of A.					
	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases	Mean	S.D.	No. Cases
S.A.T.—Verbal	492	88	680	481	83	616	379	71	4,501
S.A.T.—Mathematical	589	78	680	566	76	616	452	80	4,501
Advanced Mathematics	567	60	311	556	60	162	483	59	407
Intermediate Mathematics	547	81	184	521	60	232	456	68	820
Physics	503	81	237	502	74	181	435	67	805
Chemistry	506	74	187	489	72	194	407	68	886
Biology	493	75	70	494	74	110	397	65	1,073
English	505	94	139	482	94	118	390	91	1,016
French	377	40	145	386	59	162	347	71	896

It is apparent that students who did not matriculate make markedly lower scores on tests of both ability and achievement. Matriculants who did not enter university are, on the whole, slightly less able and less well prepared than matriculants who do enter the university. There are many exceptions to these generalizations. The variation of individual scores from the mean, as indicated by the standard deviations, show many high scoring students who matriculated, but did not attend university; and others did not obtain matriculation, yet have at least the ability to do university work. Most of the students who entered university made high scores on ability tests; a great many other high scoring individuals, nevertheless, did not enter the University of Alberta in 1956.

Some supplementary information is also available on the outside activities of these students and their general plans for the future. Ratings by the principals of extracurricular activity, separately for sports and for other activities, have been analyzed in relation to the status of the individual. Similarly, the reasons given by many students for not coming to university have been tabulated separately for matriculants and non-matriculants. The details are given in Tables XVII, XVIII and XIX.

TABLE XV

DISTRIBUTION OF SCHOLASTIC APTITUDE SCORES OF STUDENTS ENTERING THE UNIVERSITY OF ALBERTA, SEPTEMBER 1956

Percentile Rank	Frequency of Scores				
	SAT—V	SAT—M	SCAT—V	SCAT—Q	SCAT—Total
Above 75th	417	471	354	371	402
50th to 75th	172	156	142	127	125
Below 50th	95	56	52	50	21

TABLE XVI

STATUS OF STUDENTS IN 1956-57 WHO MADE HIGH SCORES (ABOVE 75th PERCENTILE) ON SCHOLASTIC APTITUDE TESTS

High Scores	Number of Students		Percent of Students	
	At U. of A.	Not	At U. of A.	Not
SAT—V	417	1,010	29.2	70.8
SAT—M	471	952	33.1	66.9
SCAT—V	354	1,252	22.0	78.0
SCAT—Q	371	1,137	24.6	75.4
SCAT—Total	402	1,185	25.3	74.7

TABLE XVII

RATINGS BY PRINCIPAL OF EXTRA-CURRICULAR ACTIVITY (OTHER THAN SPORTS) FOR THREE CATEGORIES OF STUDENTS

Rating	Matriculants		Non Matriculants
	Entered U. of A.	Did not Enter U. of A.	
Much above Average	101	96	206
Above Average	200	163	825
Average	215	222	1,777
Below Average	106	95	1,122
Much below Average	51	44	480
Not Stated	10	4	67
Total	683	624	4,477

TABLE XVIII

RATINGS BY PRINCIPAL OF EXTRA-CURRICULAR ACTIVITY IN SPORTS FOR THREE CATEGORIES OF STUDENTS

Rating	Matriculants		Non Matriculants
	Entered U. of A.	Did not Enter U. of A.	
Much above Avearge	75	60	308
Above Average	160	125	908
Average	257	236	1,650
Below Average	123	125	1,086
Much Below Average	62	77	492
Not Stated	6	1	33
Total	683	624	4,477

TABLE XIX

REASONS FOR NOT ATTENDING UNIVERSITY STATED BY STUDENTS WHO ANSWERED "NO" OR "UNCERTAIN" TO THE QUESTION, "DO YOU PLAN TO ATTEND UNIVERSITY?"

Reasons Checked	Answered "No"			Answered "Uncertain"		
	Matriculants			Matriculants		
	Entered U. of A. (No. 3)	Did Not Enter U. of A. (No. 167)	Non-Matriculants (No. 1,817)	Entered U. of A. (No. 36)	Did Not Enter U. of A. (No. 124)	Non-Matriculants (No. 1,320)
Not interested	.....	30	596	2	13	101
Lack of Money	1	37	300	11	38	350
Employment Plans	.....	12	336	3	15	228
Other Educational Plans	3	139	1,014	11	61	516
Poor Health	.....	1	7	.....	1	9
Marriage Plans	.....	6	67	.....	1	19
Parents Disapprove	.....	1	15	.....	1	3
Find Studying Difficult	.....	8	388	2	13	252
University too far from Home	.....	5	21	1	7	24
Needed at Home	.....	3	83	1	8	100

N.B.—A student might check more than one reason.

There seems to be no support for the possible hypothesis that extracurricular activities interfere with the academic performance of individuals. Most students, it seems, do not participate heavily in these activities. Between one-third and one-half of the students who did so participate matriculated in 1956; but of the students who did not participate heavily, the proportion matriculating was one-sixth to one-third. It would seem that a considerable proportion of able students are able to carry on extracurricular activities extensively, without detriment to their performance in Grade XII examinations.

Finally, the reasons given for decisions not to attend university do not confirm some other possible hypotheses. Economic condi-

tions (lack of money on the one hand or available and attractive employment on the other) are important, but not the most important factors. A large number of students are simply not interested in further study, but many claim to have education plans not involving university. Many students (mostly non-matriculants) state that they find studying difficult. It is probable that some of these replies are not realistic; but the general validity of these questions seems satisfactory. It can be seen that overwhelming numbers of individuals with no plans for university work in May 1956, did not, in fact, matriculate; and only a few of them found their way to the University of Alberta in September of that year.

The details given in the last six tables have been selected from a great mass of information which has been only partially analyzed. Information is given in these paragraphs, and in the tables attached, principally to show the material available for research of value to the University and the high schools. The Sub-committee must give such research a very low priority, and is likely not to be able to undertake much of it at all.

Summary

The data at hand indicate that the Grade XII examinations of the Province of Alberta represent the best single predictor of success at the University of Alberta. This result confirms similar studies carried out elsewhere.[5] The results, so far, seem to confirm the present matriculation regulations of the university. The C.E.E.B. tests might be used to supplement the Grade XII examinations system, especially for students from other countries or provinces. There is as yet no evidence that the C.E.E.B. tests should replace the Grade XII examinations for matriculation purposes. As a test of performance of Grade XII students generally, the C.E.E.B. examinations are distinctly inappropriate. Not all colleges and universities in the United States use the C.E.E.B. tests as matriculation examinations; and among those who do, there is considerable variation in the standard required for admission. It seem apparent, nevertheless, that senior matriculation at the University of Alberta is at the same level as matriculation based on the C.E.E.B. tests generally in the United States.

The next steps in the work of the Sub-committee will be:

1. A more elaborate analysis of the inter-relations of the various tests used with the 1956 Grade XII group;
2. The relative effectiveness of these tests, individually and in combination, in predicting success in first year university;

[5]S. C. T. Clarke "Review of Some Previous Studies on Matriculation Problems", **The Alberta Journal of Educational Research** 1958; Volume IV; pp 30 - 39.

3. Comparable studies in succeeding years as university marks become available.

Until such studies have been completed, the generalizations made in this progress report must be regarded as tentative. There is now no evidence, for example, that a change in matriculation requirements is desirable. We must, nevertheless, keep in mind the possibility that some changes will be suggested by later analysis. Similarly, the small selection of data regarding the supply of students for the University of Alberta compares closely with the comparable parts of the recent report of the Atkinson Study of Utilization of Student Resources (in Ontario). Here too, we must regard our study as preliminary and our generalizations as tentative.

A CO-OPERATIVE STUDY OF HIGH SCHOOL EXTRA-CURRICULAR ACTIVITIES

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Part I—Beginning the Study

The Five-School Project

On November 19, 1954, a group of five high school principals, two superintendents of schools, and two high school inspectors met to discuss the problems of their schools. The group had been chosen because the five schools represented had much in common. Each was located in a centre of from two to four thousand people. Each had a high school population of from one hundred to two hundred and fifty students. Each was a centralized school, serving town and country children. Each was the largest high school in a superintendency. Finally, the schools were geographically neighbors to one another. One school was forty miles from the group's meeting place; the others were all within twenty-five miles of that centre.

At the first meeting of the group, attention was devoted to two questions. Did the schools represented have enough problems in common to justify a continuing organization? If so, what were some of these problems amenable to long-term study and research? The first query was unanimously answered in the affirmative, and the group adopted the name of "The Five-School Project." Among the topics chosen for long-term attention was that of extra-curricular activities in centralized high schools, specifically in the high schools participating in the project. This writer undertook to set up a research program in this connection. Ultimately, this study was to result in information and opinions being sought from five principals, forty-seven high school teachers, hundreds of students and hundreds of parents.

Polling the Principals

The first step was the preparation and submission of a questionnaire to the principals concerned. Its purpose was primarily to gather factual information about the schools and about current extra-curricular practices. A second purpose was to identify certain positive and negative values which the principals felt to be associated with extra-curricular activities.

The factual information supplied by the principals covered the following topics:

Number of teachers on staff.
School population by grades.
Number of students conveyed to school.
Student participation in extra-curricular programs, by grades and number of activities.
Extent of participation by vanned students.
Activities included in extra-curricular program.
Out-of-school activities available to high school students.
Time in school day scheduled for extra-curricular activities.
Extent of use of gymnasium in extra-class time.
Methods of financing extra-curricular activities.
Student government.
Staff advisors.
Initiation ceremonies.
Staff participation in extra-curricular program.

The principals' opinions were sought on the following value topics:

Advantages and disadvantages of extra-curricular activities.
Steps being taken to minimize disadvantages.
Community attitudes towards extra-curricular activities.

What the Principals Say and Think

Following a study of the principals' questionnaire, the writer prepared the following material for the Five-School Project. Despite the passage of time, it still appears as valid as when it was first written.

Mary, aged sixteen, in Grade X, daughter of a service station operator, lives in an Alberta town of about three thousand people. She spends five and one-half hours a day in formal classroom study and two hours nightly at her books—a reasonable day's work in this mid-twentieth century. In addition, she is at the school for an average of an additional one and one-half hours daily, playing badminton at noon and basketball after school, or carrying out her duties as Social Convenor on the Students' Council. Somehow she also finds time to practice the piano one hour a day, attend choir practice for an hour on Tuesday evening and church for an hour on Sunday. Other obligations include the secretaryship of her church young peoples' group and a minor executive position on the local teen club. At home she is expected to make her own bed, keep her room tidy, help with the supper dishes, and on Saturday mornings to assist with the dusting and other household duties. Occasionally, to supplement her always-inadequate allowance, she does a bit of

baby-sitting or serves as relief operator at the local telephone exchange. On Saturday afternoons she has a regular job behind the counter of a local general store.

Joe, a farm boy, aged seventeen, in Grade XI, attends the same school. He also spends five and one-half hours in the classroom, half an hour at noon practising football or hockey, two hours riding back and forth on the school bus, but only one hour on his homework. He is an active member of the 4-H club, and right now is very much interested in his Hereford calf. Three nights a week he gets back to town to attend parades of the local cadet unit or play on the senior hockey team, but only after he has spent an hour and a half in his work clothes on farm chores. All day Saturday, as a rule, and a good many school days during the fall are spent on the tractor—or under it. But Joe's social life is not wholly neglected; he usually manages to attend the monthly school dances and occasionally other social gatherings.

Both Mary and Joe have very good scholastic ability, but are not doing as well at school as some people think they might. If only some way could be found to challenge these young people to greater effort and achievement—perhaps more examinations, stiffer standards, heavier courses and more of them, and more homework—they would probably do better at school.

Mary and Joe are two of the 858 students who attend five high schools in the same area of Central Alberta. Each school is located in a town of three to five thousand people, and has eight to ten teachers, and from 125 to 200 students. Of these 858, 248 are rural boys and girls who are vanned to school. Of the total, 174 are engaged in no extra-curricular activity, outside their membership in the students' council, but 209 are interesed in one organized extra-curricular activity, and the others in two, three, four and even more pursuits.

These activities are manifold. In athletics, intra-mural and inter-school, they include baseball, softball, basketball, rugby, golf, volley-ball, ping-pong, badminton, curling, hockey, boxing, wrestling, and track events—as well as the accompanying cheer leading. Social events include square dancing clubs and formal and informal dances every month or so, in addition to the elaborate graduation ritual. For the artistically inclined there are drama and glee clubs as well as school bands. Future writers find outlets for their talents on the school paper or yearbook, while incipient political leaders find seats on the students' councils. The absence of hobby clubs and clubs devoted to academic subjects, e.g., science or French, does not limit out-of-school activities. These include cadet corps for both sexes, church and social groups, numerous athletic activities (skiing,

hockey, curling, etc.), and such miscellaneous activities as 4-H clubs and the St. John's Ambulance Association.

Although three of the five principals queried stated that their school's extra-curricular activities were considered in the communities to be an important function of the school, there is no general acceptance of public financial responsibility for their support. Instead, the wherewithal is found by other means, some of dubious morality. Hidden subsidies include provincial grants for allegedly classroom equipment, e.g., movie projectors, radios, and record players, and the school boards' provision of heated and lighted quarters such as auditorium-gymnasiums. Occasionally the subsidy is more direct, e.g., the provision of athletic equipment. Service clubs sometimes sponsor a school organization such as a band or a school team, and individual business men are called on for donations (euphemistically called advertisements) towards school publications. In return for wholesome, if unprofessional, entertainment, the general public support musical and dramatic groups through their admission fees. But a great many activities are paid for by the students themselves (or their parents). A one-dollar students' union fee, virtually compulsory, is common, as well as added fees for other activities. The students charge themselves nickels, dimes, and quarters for school dances, basketball games, school papers, and even bags of candy. They raise money by still other means, such as collecting and selling pop and other bottles, selling magazine subscriptions, and diverting the mark-up on school-handled texts to school activities. But the out-of-pocket expense must add materially to the student's cost of secondary education. Leadership of these activities is generally supplied at no cost, other than the otherwise free time of the high school teachers. Perhaps there is some merit in the positional schedule that pays more to secondary school teachers than to their elementary school colleagues!

What are the advantages of all this non-academic activity? Those claimed by the principals are many. They include the development of social assets, including cooperation, sense of responsibility, citizenship, sportsmanship, character training, ability to handle meetings, and the breaking down of reserve. Mental and physical health are improved, and experience is gained in competitive games. Dividends more closely associated with the traditional work of the school include development of school morale and "school-centredness," improvement in discipline, acquisition of much factual information, better feelings toward staff, and motivation, through elegibility rules and otherwise, to do better work in school and to continue in school longer. And finally, the boys and girls have a good time! On the other side of the ledger, it is also alleged that

extra-curricular activities may interfere with studies, especially for poorer students, and may cause disruption of school programs, distraction of pupils from their studies, and, when outside coaches are employed, a deterioration in school discipline.

Part II—What High School Teachers Think of Extra-Curricular Activities

During February or March, 1955, forty-seven teachers in five Alberta high schools with student populations of 125-225 completed a questionnaire on extra-curricular activities in the high school.

Values

Forty-five teachers agreed that, as far as possible, all high school students should participate in some out-of-school activity, either under direction of the school or otherwise. Two teachers did not answer this question. However, thirty-one teachers indicated that they did not believe most (90% or more) of their students are participating to their maximum beneficial effect. Thirty-three respondents suggested two such interests as best for the average student, two indicated one activity, eight indicated three, one indicated one or two, and one teacher two or three such interests. However, there was far less agreement on the amount of time which students might well devote to such activities. Nineteen suggested five or more hours, ten gave four to five hours as the best figure, most of the others two to something less than four, but two teachers did not answer, and one teacher would limit students to a single hour.

A number of positive and negative values which might be considered as accruing to extra-curricular activities was suggested by the principals of the schools concerned. The teachers were asked to rate their validity on a five-point scale. A summary of the ratings of those who did so appears as Table I below.

Teacher Participation

The extent to which teachers participate in extra-curricular activities varies widely. For the week of February 28-March 5, 1955, forty-five teachers reported that they had spent from zero to twenty-four hours on such duties, eight giving the minimum figure, and seven reporting more than six hours. Forty-one reported their estimate of time for an average week at figures from zero (five teachers) to 14-16 hours, with five over six hours.

Their opinions as to the amount of time per week which teachers might reasonably be asked to devote to such activities (without extra compensation) were almost as divergent, ranging from zero to five hours. Twenty- five suggested two to three hours, eight

indicated zero to two hours, eight suggested figures of four to five hours, and five did not answer.

Asked if some teachers should be exempt from supervision for any reason, thirty-one teachers replied in the affirmative giving as reasons for such exemption heavy teaching loads, lack of interest or special abilities, age, and poor health. Other reasons for exemptions included inexperience (beginning teachers should not be too heavily loaded), other school assignments such as repair and construction jobs, and the claim that such out-of-school activities should be shared by all adult members of the community, of which the teacher is one. Nine teachers indicated that all should share in these activities. These teachers suggested that it is neither equitable nor possible to exempt any teachers from extra-classroom activities, and that there is such a variety of activity that all teachers can participate. In general, the teachers as a group feel that all who can give service in extra-curricular activities without being overburdened should do so.

Financing Extra-Curricular Activities

Asked whether school boards should finance high school extra-curricular activities as they do other services, twenty respondents answered unqualifiedly in the affirmative and twelve others suggested that boards finance such activities partially or within limits. Twelve other were opposed to such financial support.

As to compensation for their own out-of-class efforts, twenty felt that such compensation should take the form of lightened teaching loads, five were in favor of added monetary remuneration, thirteen felt that both would be reasonable, and two were opposed to either.

Other Comments

A number of further comments are of interest. Some suggested that teacher preparation should include training in extra-curricular activities, and that staffs should be built up with these qualifications in mind, so that there would be a variety of such talents available in each school. At present, some teachers feel too much falls on the shoulders of too few, and elementary teachers are the fortunate ones. Perhaps positional-level salary schedules are the answer. Some apprehension is felt that such activities interfere with regular studies for students at all levels of ability if such activities are too time-demanding, if study time at home is not budgeted, or if the student is engaged in part-time work. One teacher complained that trustees know less about extra-curricular activities than about any other part of the school program. One interesting suggestion was that professionalized sports such as hockey and foot-ball should be

left to outside organizations, and that the schools should concentrate on recreational sports such as tennis and golf and on other recreational activities.

TABLE I

	1 almost always untrue	2 usually untrue	3 occasionally or doubtfully true	4 usually true	5 almost always true
(a) Development of social assets such as cooperation, sense of responsibility, citizenship, sportsmanship, character training, ability to handle meetings, and breaking down of reserve is promoted	1	.....	5	35	6
(b) Mental and physical health are improved	.....	.....	10	35	2
(c) Experience in gained in competitive games	.....	.....	2	27	3
(d) School morale is improved and "school centredness" is encouraged	.....	.....	5	36	5
(e) School discipline is improved	2	1	30	14	2
(f) Much factual information is gained	5	14	22	6	.....
(g) Better feelings towards the staff are developed	.....	.....	11	36	3
(h) Eligibility requirements motivate better school work	2	2	25	10	6
(i) Extra-curricular activities make school more enjoyable	.....	1	5	36	13
(j) With some students, especially the poorer ones, the extra-curricular activities adversely affect school progress	.....	7	17	19	4
(k) They often disrupt the regular program	2	14	16	10	5
(l) The employment of outside coaches is detrimental to school discipline	4	8	14	11	5

Part III—Participation by High School Students in Extra-Curricular Activities

R. E. Rees

High School Inspector

Extra-curricular activities are not prescribed by departmental regulations but are generally considered desirable for the social and physical development of students and may provide motivation for curricular work. Some extra-curricular activities are sponsored by the school, such as student council meetings, school parties, clubs, inter-school games, house league games, etc., while others may be under community leadership, for example Four-H club, church choir, cadets, etc.

During the spring term 1955 more than 750 students representing practically the total enrolment of five high schools completed questionnaires. These students were distributed by grade, sex and residence as shown in Table II. This student questionnaire probed 19 different aspects of the extra-curricular project, giving each pupil a choice of 97 responses. Both school-sponsored and community-sponsored activities were studied.

Table II

TOTAL ENROLMENT BY GRADE AND SEX

Grade	Rural		Urban	
	Boys	Girls	Boys	Girls
X	59	60	87	98
XI	43	39	77	84
XII	27	38	67	74

The number of students involved was sufficiently large in each category to permit some generalization and make possible the determination of patterns of participation in extra-curricular activities for the schools concerned. However, any application of the conclusions to other parts of the province should be made with caution; preferably similar studies should be conducted in other parts of the province and the results compared with those given below.

To facilitate analysis, the replies of each pupil were placed on an IBM card, following which numerous combinations of the data were

used to provide answers to specific questions in arriving at the conclusions presented. The extent of participation, grade and sex differences in extra-curricular activity and the relationship between home study and extra-curricular activity were studied, as well as the effect of conveying children to school by bus.

Extent of Participation

(a) *In School-sponsored extra-curricular activities.*

The most striking revelation was that 35% of the students did not take part in any extra-curricular activity. It would appear that the ideal of all high school pupils participating in some out of school activity was far from being achieved. Of those who were active, the vast majority exercised reasonable moderation, the average active student spending just over two hours per week on extra-curricular activities. Fewer than 4% of the students exceeded ten hours per week. Table III provides the data from which the above conclusions were reached.

TABLE III

PARTICIPATION IN SCHOOL-SPONSORED EXTRA-CURRICULAR ACTIVITIES

		Number of hours per week spent on extra-curricular activities—school sponsored								
		0	To 1	To 2	To 3	To 4	To 5	To 10	10 +	
Conveyed by Bus	No.	98	37	40	28	22	11	20	10	266
	Per Cent	36.8	13.9	15.0	10.5	8.3	4.1	7.5	3.8	
Resident	No.	174	64	64	66	40	30	40	15	493
	Per Cent	35.4	13.0	13.0	13.4	8.1	6.1	8.1	3.4	

(b) *In Out-of-school activities.*

An analysis of responses concerning participation in out-of-school activities shows the same general pattern as given in (a) above, although the figures presented in Table IV are somewhat different. Some 25% of the students were inactive in this respect, while the average student spent about two hours per week in community sponsored activities.

TABLE IV

PARTICIPATION IN ACTIVITIES NOT SPONSORED BY THE SCHOOL

		Number of hours per week spent on extra-curricular activities—not sponsored by school								
		0	To 1	To 2	To 3	To 4	To 5	To 10	10 +	
Conveyed by Bus	No.	54	23	51	58	40	17	21	1	265
	Per Cent	20.4	8.7	19.2	21.8	15.1	6.4	7.9	0.4	
Resident	No.	127	40	76	102	58	37	42	13	495
	Per Cent	25.6	8.1	15.3	20.6	11.7	7.5	8.5	2.6	

(c) *Relation between time spent in school sponsored extra-curricular activities and in community organized activities.*

The general conclusions warranted by the data are:

(i) Many students spent no time on either school-sponsored or community-sponsored activities.

(ii) The rare student spent more than ten hours per week on one or the other type of activity, which in combination might require of the student an excessive amount of time.

(iii) A sizeable number of students spent an equivalent amount of time on each.

(iv) The majority of students spent time on both, giving more time to one than to the other, but keeping within reasonable bounds the total time devoted to activities outside of prescribed school work.

Sex and Grade Differences

In Table V figures are presented to show the time spent by boys and girls at each grade level in school-sponsored extra-curricular activities.

This information was combined with other data available from the questionnaires and enabled the writer to draw the following conclusions:

(i) Girls were slightly more active in school-sponsored extra-curricular activities than were the boys.

TABLE V

PARTICIPATION IN SCHOOL-SPONSORED EXTRA-CURRICULAR ACTIVITIES BY GRADE AND SEX

		Number of hours per week spent on extra-curricular activities—school sponsored only							
	Grade	0	To 1	To 2	To 3	To 4	To 5	To 10	10+
Boys	10	57	16	21	19	15	10	8	2
	11	43	13	21	16	10	6	11	2
	12	25	16	16	9	8	8	9	4
Girls	10	59	23	14	25	13	7	15	3
	11	50	16	16	12	7	8	9	6
	12	37	17	16	13	10	2	8	8

(ii) Boys were slightly more active than girls in outside of school activities.

(iii) Somewhat more time was spent on school-sponsored extra-curricular activities at the higher grade levels than in the lower grades.

(iv) Somewhat more time was spent on outside school activities by students entering high school than by those enrolled in the higher grades.

In all four cases given above, time differences were small, but clearly observable. The trend noted in (iii) and (iv) might be expected, since students who have been in high school for a year or more are familiar with activities, tend to identify themselves more closely with the school's program, and being known by other students, are chosen for positions of responsibility in student organizations.

The conclusions noted in (i) and (ii) might serve as further evidence of a well known psychological principle that girls are more suggestible and conform more readily than boys, whereas the boys continue to show their independence by maintaining their associations with activities outside the school.

The Effect of Travel by Bus on Extra-Curricular Participation

It might reasonably be expected that students who must commute daily from outlying points would be denied full participation

in extra-curricular activities. Such a supposition was not supported by the facts. In Tables III and IV the relevant data were presented which support the following conclusions:

(i) Students who are vanned to and from school daily participate in both school-sponsored and community-sponsored activities to about the same extent as do those children resident within walking distance of the school.

(ii) There was a slight tendency for some resident students to spend more time on school-sponsored extra-curricular activities, while this condition was reversed in the case of community-sponsored activities.

Relationship Between the Number of Credits Carried and Participation in Extra-Curicular Activities

The amount of time spent on extra-curricular activities by high school students seemed to be independent of the number of high school credits carried. Approximately the same percentage of students engaged in extra-curricular activities whether the number of high school credits represented a light or a heavy course load. These statements seem warranted on the basis of Table VI.

TABLE VI

RELATIONSHIP BETWEEN NUMBER OF HIGH SCHOOL CREDITS CARRIED AND PARTICIPATION IN EXTRA-CURRICULAR ACTIVITIES

Number of High School Credits	20 or fewer	21 - 25	26 - 30	31 - 35	36 - 40
Percent of group in extra-curricular activities	62.5%	69.4%	64.8%	62.6%	65.1%

The Effect of Extra-Curricular Activities on Hours of Home Study

In our study of hours of homework, two trends were noticeable, namely that students progressively spent more time on homework as they advanced to the higher grades, and that girls devoted more time to home study than did boys. It was also found that in those schools where extra-curricular participation was highest, students reported more hours of home study. Might it be that a solid program of school activities does in fact act as a motivating factor for academic effort?

This latter question was tested statistically using the entire population of the schools. A correlation was computed between hours of home study and hours of participation in extra-curricular

activities, giving a coefficient of correlation of 0.011. This would indicate that no relationship existed between these two factors. It would appear that participation in extra-curricular activities neither stimulated nor interfered with home study.

Variations Among the Five High Schools

Although the five schools selected for this study were of comparable size, organization, and served similar types of communities, a fairly wide range of variability became evident as the data were analyzed. Somewhat varying patterns emerged for each school, posing problems for study and solution by the staffs concerned. The numbers of children commuting each day varied from 17% to 57% of the various school populations. The range of non-participants in school-sponsored extra-curricular activities was from 20% to 71% of each student body, while for community-sponsored activities the corresponding range was 13% to 40%.

Since it was found that an interest in extra-curricular activities did not interfere with hours devoted to home study and since participation in extra-curricular activities is considered desirable for the social and physical development of students, certain questions press for an answer. How can all students be induced to take part in the extra-curricular program? What type of activities should be promoted? How can the most effective sponsorship be provided? What modifications of the program are essential in order to meet the school bus problem? The solution to these problems may involve not only the school staff, but in addition the parents, the school board, ratepayers and other members of the community.

Part IV—What the Parents Think

J. W. Chalmers

In 1956, questionnaires were sent to the homes of all parents who had children attending one of the schools in the Five-School Project. A total of 371 questionnaires was returned. Like the questionnaire answered by the students themselves, this consisted of a number (27) of multiple-choice items so arranged that responses could be transferred to IBM cards for processing. Unlike the students' questionnaire, however, this one dealt mainly with opinions—how parents felt about extra-curricular activities, their positive and negative values, and what can reasonably be expected of schools and of teachers.

Responses of the parents indicate that they regard high school extra-curricular activities very favorably. Such participation was considered valuable, quite important or equal in importance to circular offerings by 345 respondents, while only 26 rated them as

unimportant or did not answer at all. By overwhelming majorities they agreed that such activities improve students' physical health, recreational skills, social adjustment, and relations with teachers. Substantial numbers, but fewer than one half, felt that they help a student in learning specific facts and choosing his life work. The only disadvantage that most parents attributed to extra-curricular activities is that they do interfere with homework and studies. Substantial numbers, but fewer than half of the respondents alleged that such activities interfere with home chores and duties, are restricted to best players only, and are too costly in equipment and supplies. Only forty-three respondents agreed that school does not offer activities that appeal to their children. Two hundred and eighty-five disagreed, fifty-eight were undecided, five did not answer.

The respondents' generally favorable attitudes towards extra-curricular activities are reflected in their opinion, expressed by the majority, that teachers are providing all the help and leadership in such fields that can reasonably be expected and that qualifications for extra-curricular leadership should be considered in choosing staff. The great majority of parents also feel that schools should provide assistance for such activities at the present levels. Many believe that school boards should go substantially further in this direction. Only nineteen maintained that school boards should restrict such activities. Six offered no opinion.

Parents appear to have definite expectations with respect to high school teachers and extra-curricular activities. Forty-three would exempt staff members from any unpaid out-of-class activities and twenty-one did not answer but 257 think such teachers should spend from one to three or more hours per week in such duties, and fifty would impose even heavier loads. Reasons for exempting teachers from such duties showed considerable variation in acceptability. The great majority would exempt teachers from such activity on grounds of poor health or age, and a lesser impressive majority on grounds of a heavy teaching load. Each of the other suggested reasons—lack of interest, or of special ability or of experience, or from domestic reasons—a substantial minority was willing to accept. Yet a majority agreed that it was neither fair no equitable to exempt any high school teacher.

At the same time, only 208 would compensate teachers for heavy extra-curricular loads by lightened teaching loads or extra pay or both. One hundred and forty-seven were opposed to such measures; sixteen did not answer. One hundred and sixty-two would, however, give high school teachers, as such, higher salaries, 129 would not, seventy-eight were undecided, two did not answer.

The questionnaire was deliberately developed to expose inconsistencies in parents' attitudes about extra-curricular activities. Thus, 207 respondents agreed that it was neither fair nor possible to exempt any teacher from out-of-school activities. Yet, of this number, 103 indicate that teachers should be so exempted on grounds of heavy teaching load, 147 on bases of poor health or age, and substantial but lesser numbers for each of the other reasons such as lack of interest or of special ability, inexperience, and domestic responsibilities.

Similarly, 325 respondents considered extra-curricular activities to be valuable or quite important, but seventy-one of this number did not agree that leadership qualities for such activities should be considered in choosing high school staff members.

Parents expect teachers to spend a great deal of time on extra-curricular duties, but are not convinced that they should receive any compensation for such time. Thus, 287 respondents would have such teachers devote from two to three or more hours on such duties, yet seventy-seven would allow neither extra pay nor lightened teaching loads in return.

Summary

In general, parents appear to be well satisfied with the extra-curricular programs of the schools which their children attend. Only a very small number regard them as unimportant. They appear to believe that such activities improve physical health, and social adjustment, develop recreational skills, and improve teacher student relationships. In addition, a substantial number feel that such activities help students to choose their life work and learn specific facts. On the other hand, a majority are convinced that such activities interfere with students' homework and studies, while a substantial minority believe that equipment and supplies are too costly, that sports activities are restricted only to best players, and that extra-curricular activities interfere with home duties and chores.

Although parents are convinced of the value of extra-curricular activities, and the majority feel that all teachers should provide leadership in these fields, at the same time many of them would exempt teachers for specified reasons, particularly a heavy teaching load or poor health or age.

Parents' expectations of teachers are high. Only forty-three suggest that teachers should not be expected to spend time on out-of-class activities, while 257 suggest from one to three or more hours of such work would be reasonable, and fifty intimate that four or more hours might be expected. At the same time, almost

half the respondents would compensate for such work neither by extra pay nor by lightened teaching loads, and 162 of the questionnaires indicate definite opinions that high school teachers as such should receive higher salaries in recognition of their out-of-school responsibilities.

Two other characteristics of the questionnaires might be noted. In general, relatively few items were left uncompleted by the respondents. This fact suggests that they regarded the task imposed on them quite seriously. This inference is supported by the fact that over half the questionnaires were completed by both parents working in consultation.

THE CONSTRUCTION OF A SCALE TO MEASURE ADULT ATTITUDE TOWARD THE ALBERTA EDUCATIONAL SYSTEM

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The Problem

In 1952 Canada spent $432,000,000 for elementary and secondary education. Alberta's contribution to this amount was $35,,715,000 (7). Are we spending too much? Do the schools teach what our citizens want taught? What do Albertans think of their schools? If the attitude of the public toward education could be determined, these and many other questions could be answered.

An attitude is an enduring acquired predisposition to react in a characteristic way, usually favorably or unfavorably, toward a given type of person, object, situation or idea. Favorable attitudes are necessary for the maintenance and improvement of our institutions.

The main purpose of this study was to devise and try out a tentative scale to measure adult attitude toward the Alberta educational system.

Early Studies

The literature available shows few studies of attitude toward education. Five have appeared since 1937, four of them in the last thirteen years. A doctoral thesis on "The Attitudes and Opinions of California High School Seniors Toward Current Social Issues," was completed in 1937 by Smith (10). A section of his questionnaire dealt with "Attitudes Toward the School."

A more rcent study (1944) was completed by the National Opinion Research Center (8) at the University of Denver, called, "The Public Looks at Education." They found that eight of ten parents with children in public schools reported satisfaction with what their children were getting out of their school work.

Recent Studies

A more recent study was carried out in 1953 in the province of Nova Scotia. A commission surveyed opinions under the following headings:

(a) Teachers
(b) Teacher-parent-pupil relationships

(c) Finance and administrative responsibility
(d) Physical facilities
(e) School program

A summary of expressed opinions indicated a moderately favorable attitude toward the phases of education under scrutiny.

Another more recent (1954) study was made by Mr. O. P. Larson (6), Superintendent of Schools for the County of Newell, Alberta. The purpose of this study was to determine what parents, teachers, and pupils thought about their schools, and to use the findings to improve educational conditions.

The results showed that parents were better satisfied than teachers that pupils were getting value from their school work and that it would be useful in later life. Teaching and disciplinary methods and the amount of homework assigned were all satisfactory to the majority of parents.

In 1957 a report on the fourth and last study appeared. It was made on a grant from the Kellogg Foundation to the University of Florida and was reported by Hines and Grobman (5) in an article entitled, "What Parents Think About Their Schools and What They Know About Them."

They found that a lack of positive feeling toward the school was common to parents of low economic and education backgrounds. They found that parents did not know about several aspects of the schools which the authors felt they should have known. When parents were asked specific questions their replies were usually favorable.

Of the five studies presented only two since 1950 were Canadian. Techniques differed in all cases and ranged from questionnaire to interview. None of the surveys indicates that a statistical validation of either the scale or its items had been carried out.

Design of the Study

Preliminary work toward devising an attitude scale was done by students in the Faculty of Education in the 1955 winter session. Forty-eight statements were patterned after those in Remmers' (9) *Introduction to Opinion and Attitude Measurements,* Hand's (4) *Illinois Study,* and Cronbach's (1) *Essentials of Psychological Testing.* The forty-eight statements were allotted to two forms, A and B, of twenty-four items each, and were submitted for criticism to various members of the University staff.

In the light of criticisms received the questions were revised in form, a few broken up, some discarded, and a few added. It now appeared feasible to reconstitute two Forms, each with twenty-five

items, and divided into five categories of five questions (items) each. The categories decided upon were:

1. The general value of education
2. Discipline
3. Teaching efficiency
4. The curriculum
5. Costs

Each item was provided with a five-point marking scale to register opinions ranging from strong approval to strong disapproval.

The two forms so constituted were now administered to adult Summer Session students at the University of Alberta. This administration yielded 56 replies on Form I and 53 on Form II. An item analysis was made by correlating each item score with total test score and viewing each correlation value in the light of Table 25 in Garrett's (3) Statistics in Psychology and Education (p. 200). All items failing to show a correlation significantly different from zero were discarded. From those remaining, twenty-five were selected to constitute a single form, Form III with five items in each of the five categories.

Form III

General Value of Education

3. Schools of today prepare children to cope with life better than they did when I was young.
5. The schools of today give more support and encouragement to the average student than they used to.
6. Too much of a person's lifetime is spent getting an education.
8. Schools today tend to develop lazy students.
10. I am not satisfied with the schools in my own district.

Discipline

13. The idea of self-discipline now used in many of our schools today is more effective than discipline through fear.
14. The initiative stimulated in schools of today benefits a person the rest of his life.
16. The type of discipline in our schools is to blame for most of our juvenile delinquency.
18. Discipline in most schools is too lax.
20. The play atmosphere of schools today does not develop perseverence.

Teaching Efficiency

21. The present system of education in Alberta promotes more efficient learning than ever before.
24. A real effort is being made in Alberta to increase the number of well-trained teachers.
25. The teaching methods of today are a real inspiration to pupils.
26. I could teach my children better than the schools do.
30. The quality of teachers is falling.

Curriculum

31. Athletics are a very beneficial part of the school program.
32. The variety of subjects taught in our schools today is better for the student than the former emphasis on only a few subjects.
33. The standard of education in Alberta is equal to that in any part of Canada.
34. Students of today are better informed than I was when I was going to school.
35. The schools under present conditions are teaching the things students should learn.

Costs

43. I am glad to see more money being spent to equip school science laboratories adequately.
44. It is worth the cost of counters, stoves, and sewing machines to have good facilities for household economics courses.
46. Some of our school buildings are unnecessarily elaborate and costly.
47. School administration costs (caretaking and secretarial work) are much too high.
48. School costs are too high for the results achieved.

Administration of Form III

Form III of the scale was administered to a widely distributed number of adults, approximately 1,000, throughout the province. Teachers, principals, and superintendents distributed the questionnaire and returned the completed forms to the writer for analysis. Limited inferences only may be drawn from the data because of the inherent bias of the sample. Since the respondents were selected by teachers they might be assumed to be mainly friends and probably more favorably disposed toward our educational system than a truly representative sample would have been. However, the pro-

cedure for analyzing a representative sample was utilized.

Personal data were gathered from each person as far as possible on the following items: sex, parental status, size of center of population, age, religion, native language, level of formal education, and socio-economic status.

Findings

The final item and category analysis is based on the number of persons completing the scale. This varies, because of omissions, from 981 to 1,022.

Table I shows the coefficients of correlation of items versus total score. The correlation can be seen for the item's first appearance in Form I or Form II and its second appearance in the final scale,

TABLE I

CORRELATION OF ITEM RESPONSES AGAINST TOTAL SCORE FOR PRELIMINARY AND FINAL ITEM ANALYSIS GROUPED BY COMPONENTS

Component	Form III Number	Classified Item Number	Forms I or II r	Form III r
General Value of education	1	3	.49	.51
	24	5	.49	.54
	9	6	.40	.26
	11	8	.61	.36
	18	10	.53	.35
Discipline	7	13	.63	.64
	2	14	.49	.58
	13	16	.34	.38
	22	18	.49	.45
	5	20	.53	.41
Teacher efficiency	20	21	.64	.66
	4	24	.46	.36
	19	25	.53	.42
	21	26	.49	.46
	3	30	.59	.37
Curriculum	14	31	.57	.33
	25	32	.57	.42
	17	33	.57	.45
	23	34	.54	.42
	10	35	.48	.47
Costs	16	43	.42	.27
	6	44	.41	.38
	12	46	.35	.54
	8	47	.38	.29
	15	48	.47	.31

Form III. The correlations decreased for eighteen items and increased for seven as the sample size was increased from fifty-six and fifty-three to 1,000.

In computing correlations of category score against total score, the scores for the questions constituting each category were summed, punched on a set of International Business Machine cards, and their frequency accumulated on a vertical axis in intervals of 2 units each. The frequencies of total scores on the same questionnaire were accumulated on the horizontal axis in ten unit intervals. The frequencies of this scattergram were used to calculate the following coefficients of correlation.

TABLE II

CORRELATION OF CATEGORY SCORES AGAINST TOTAL SCORE ON TWO PRELIMINARY FORMS AND FINAL FORM OF ALBERTA SCALE

Component	Form I r	Form II r	Form III r
General value of education	.48	.78	.81
Discipline	.63	.52	.78
Teacher efficiency	.66	.51	.78
Curriculum	.74	.59	.76
Costs	.53	.40	.59

Personal Data Analysis

A set of cards was punched on the International Business Machine showing all the sub-divisions of each of the eight personal data classifications and also showing total score. This meant that a sorting machine could classify the cards in terms of each of these groups. When this had been done, the total scores on each card were accumulated in intervals of ten units. The range extended from twenty to one hundred and nineteen. As an example the cards were classified by sex into male and female respondents. The number of males scoring between twenty and twenty-nine were accumulated, those between thirty and thirty-nine, forty and forty-nine and so on. The same was done for the cards in the "female" pile. These frequencies were used to calculate the means and standard deviations of each sub-group. Also calculated was the standard error of each mean and the standard error of the difference of two means. The significance of the differences of any two comparable means was determined by a critical ratio test in distributions where the variances were homogeneous (Garrett, p. 215, and Table D, p. 427). When standard deviations of two sub-groups were

significantly different, it was necessary to apply the Cochran and Cox test for significance of mean differences (2).

One table (Table III) showing the analysis of one personal data group will be given but only a summary will be made of other attitude findings with respect to sex, parental status, size of center of population, age, religion, native language, and socio-economic status. This procedure is being followed to emphasize the limitations of this study. The sample of persons answering questions was probably unrepresentative of Alberta's population because of the method of selecting respondents. Furthermore, the study has not included procedures to determine the reliability of the scale. These results must then be viewed as valid with respect to this one sample of adult Albertans.

TABLE III

ALBERTA ATTITUDE SCALE MEAN SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, AND SIGNIFICANCE LEVELS OF THE DIFFERENCES BETWEEN MEANS, GROUPED ACCORDING TO EDUCATION

Education	% of Sample	N*	Mean	SD	S_M
Grade IX or Less	27	262	89.19	12.32	.762
Grade X. XI, XII	43	429	87.25	12.37	.596
Technical or Business College	19	186	86.06	14.20	1.04
University	10	101	83.31	13.08	1.301

SIGNIFICANCE LEVELS

Education		Grade X. XI, XII	Technical or Business College	University
Grade IX or Less	Critical ratio	2.008	2.424	4.02
	Signif. level	.05	.05	.01
Grade X, XI, XII	Critical ratio	.....	.993	2.753
	Signif. level	.....	.....	.01
Technical or Business College	Critical ratio	.....	.....	1.59
	Signif. level	.....	.....	.....

*N number
SD standard deviation
S_M standard error mean

When the respondents were classified in terms of the levels of formal education attained, the following results were obtained. The attitude of the "Grade IX or Less" group toward education was significantly more favorable than groups representing increasing levels of formal education. The trend is also apparent in that the "Grades X, XI, and XII" group also holds a significantly more favorable attitude than the "University" group but differs slightly from its neighboring group with "Technical or Business College" training.

This trend of the more the education the fess favorable the attitude is difficult to explain. Some possible reasons may be:

1. The groups lacking formal schooling respect training they have not received.
2. The groups with little schooling may try to please the persons administering the questionnaire especially if this person were a school principal or superintendent connected with their children's educational success.
3. The groups possessing superior training may be able to detect imperfections in the school system and hence hold less favorable attitudes toward the Alberta educational system.

A summary of personal data findings for the sample tested indicates:

(a) Women have a more favorable attitude than men toward the Alberta educational system.

(b) The attitude of parents and non-parents is not appreciably different.

(c) No difference in attitude exists among persons living in cities, towns, villages, and rural areas.

(d) Persons under thirty-five years of age have a more favorable attitude toward education than those between thirty-five and fifty-four years of age.

(e) The attitudes of Protestants and Roman Catholics are not distinguishable, and they are less favorable toward the Alberta educational system than those of persons representing other religions.

(f) The attitude of Ukrainian and Polish Canadians toward the Alberta educational system is more favorable than that of English or French speaking groups.

(g) Increasing amounts of formal education result in increasingly less favorable attitudes towards the Alberta educational system.

(h) Persons earning less than $3,000 annually have the most

favorable attitude toward the Alberta educational system, followed by those earning over $6,000 a year. Persons earning from $3,000 to $6,000 a year have the most unfavorable attitude.

Suggestions for Further Research

Explanations for many of the findings are not apparent. Several hypotheses which could be tested are:

1. What attitude will a representative and randomly selected sample yield for adult Albertans?
2. How reliable is the scale in measuring attitude?
3. Do younger adults tend to be less critical of education than older persons?
4. Do English speaking groups hold relatively unfavorable attitudes and, if so, why?
5. Is there any evidence to show that unsigned questionnaires yield any more valid results than do signed questionnaires or personal interviews?

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HOW MANY ALBERTA MATRICULANTS REGISTER AS FRESHMEN AT THE UNIVERSITY OF ALBERTA

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The Problems

The opinion is often expressed that too few of the students who pass their matriculation examinations carry on with academic work at the university level. There is also considerable speculation about the factors which may influence the student in his decision to remain away from university, such factors as distance from the university, uncertainty about his level of ability, lack of a clear choice, insufficient inspiration to make the additional four years work worthwhile, or the lack of the three or four thousand dollars necessary to finance the course. The information presented here was collected as a beginning in dealing with these problems.

Purpose of the Study

As a first step it was decided to find the schools and school districts in which the students who registered at the University of Alberta as freshmen had taken their matriculation examinations. These data could then be related to the number of students who had written matriculation examinations in that district in June of the year under consideration. A tentative hypothesis to be tested was that distance from the university would affect the percentage of students attending university from any given area. Without a further breakdown it would not, however, indicate the number of individuals entering any particular faculty from any given area.

Procedure

Beginning in September, 1954, all freshmen who took the required psychological tests were asked to complete questionnaires indicating where they had written their last matriculation examinations and the year of writing. This group included only those students registering at the University of Alberta for the first time and there were very few, perhaps thirty, freshmen who did not complete the questionnaire. The questionnaire had been designed originally to make possible a report to each high school principal of the students from his school who had registered at the University of Alberta that fall, and for whom the principal or the guidance counsellor had submitted a report.

The Examinations Branch of the Department of Education agreed to provide Student Advisory Services of the University of Alberta with the number of students who had written any matriculation examinations in June of that year, the breakdown in terms of school divisions, counties, cities and departmental centers. No attempt was made to determine averages or numbers of examinations written for the individual student, just as no distinction was made of those who had come to university directly from high school and those who had been away from school for one or more years. These distinctions would add little to the value of the report in the form adopted, that of pooling the information over a three-year period.

Results

The following tables present the information gained by combining the information from the Student Advisory Services' survey with the records of the Examinations Branch of the Department of Education.

Table I presents the analysis of the 1954 survey in terms of distances from the City of Edmonton. A similar report was prepared using Calgary as the centre for comparison but it is not presented because of its limited usefulness. The areas would be comparable only if the services available in each centre were comparable.

TABLE I

UNIVERSITY OF ALBERTA FRESHMAN (New) ADMISSIONS 1954

WITHIN A GIVEN RADIUS FROM EDMONTON

Miles	Gr. XII matriculation examinations written in June	Freshmen Enrolment at the University of Alberta in September		
		Edmonton	Calgary	Total
0 - 25	1541	326 (21)%	2	328 (21)%
25 - 50	376	105 (28)	2	107 (28)
50 - 100	1212	242 (20)	13 (1)%	255 (21)
100 - 150	387	72 (19)	10 (2)	82 (21)
150 - 200	1378	118 (8.5)	117 (8.5)	235 (17)
200 - 250	233	73 (31)	15 (6)	87 (37)
250 - 300	785	108 (14)	70 (9)	178 (23)
0 - 50	1917	431 (23)	4	435 (23)
TOTALS	5912	1043 (17)	229 (4)	1272 (21)

Obviously no clear relationship emerges between distance of travel and percentages of possible candidates entering at Edmonton.

Tables II to IV show the relationship between the number of students writing Grade XII matriculation subjects in June and those entering the University of Alberta as freshmen in September. In these tables the years 1955, 1956 and 1957 have been combined. The 1954 divisions were reported for somewhat different areas and so have not been included.

Table V gives the comparison for the individual schools in Edmonton and Calgary for the years 1956 and 1957.

TABLE II

SCHOOL DIVISIONS — 1955-57 INCLUSIVE

	Grade XII matriculation examinations written in June	Freshman Enrolment at the University of Alberta in September		
		Edmonton	Calgary	Total
1. Berry Creek	26	0	0	0
2. St. Mary's River	388	51	19	70
3. Foremost	114	6	1	7
4. Medicine Hat	98	5	2	7
6. Taber	261	20	14	34
7. Lethbridge	498	60	41	101
8. Acadia	76	3	5	8
9. Sullivan Lake	62	8	9	17
10. Peace River	202	45	1	46
11. Lac Ste. Anne	158	19	0	19
12. Edson	181	32	1	33
13. Clover Bar	195	30	0	30
15. Rocky Mountain House	102	8	2	10
16. Neutral Hills	47	2	0	2
17. Holden	242	42	0	42
18. Lamont	368	87	1	88
19. Vegreville	324	54	0	51
20. Camrose	527	93	2	95
21. Two Hills	287	82	3	85
22. Killam	289	46	1	47
23. Stony Plain	324	36	0	36
24. Sturgeon	324	41	0	41
25. Vermilion	237	46	0	46
27. Castor	113	27	3	30
28. MacLeod	232	46	23	69
29. Pincher Creek	227	41	29	70
30. Drumheller	265	30	16	46
31. Olds	209	24	16	40
32. Wainwright	173	23	1	24
33. Provost	145	29	0	29
35. Red Deer	92	17	6	23
36. Wetaskiwin	42	11	0	11
37. Westlock	217	39	0	39
38. Foothills	291	29	12	41
39. Smoky Lake	206	38	0	38
40. Wheatland	208	14	24	38
41. Calgary	194	6	5	11
42. Athabasca	209	53	0	53
45. St. Paul	220	24	0	24
46. Bonnyville	303	49	0	49
47. Spirit River	148	24	0	24
48. High Prairie	207	39	2	41
49. Leduc	338	55	0	55
50. Fairview	162	14	1	15
51. Lac La Biche	86	15	0	15
52. Fort Vermilion	7	1	0	1
56. Lacombe	478	56	6	62
58. Coal Branch	10	1	0	1
59. Barrhead	223	32	0	32
60. Three Hills	314	21	17	38

TABLE III

COUNTIES — 1955-57 INCLUSIVE

	Grade XII matriculation examinations written in June	Freshman Enrolment at the University of Alberta in September Edmonton	Calgary	Total
1. Grande Prairie	423	40	0	40 (10)%
2. Vulcan	175	18	19	37 (21)
3. Ponoka	202	45	4	49 (24)
4. Newell	258	20	27	47 (18)
5. Warner	271	30	11	41 (15)
6. Stettler	184	22	2	24 (13)
7. Thorhild	156	46	0	46 (29)
Total in Counties	1670	221	63	284 (17)

TABLE IV

CITY SCHOOLS AND DOMINION PARKS—1955-57 INCLUSIVE

	Grade XII matriculation examinations written in June	Freshman Enrolment at the University of Alberta in September Edmonton	Calgary	Total
1. Edmonton	4538	1086	12	1098 (24)%
2. Calgary	3632	239	416	655 (18)
3. Lethbridge	591	69	26	95 (16)
4. Medicine Hat	490	50	22	72 (15)
5. Red Deer	658	229	52	281 (43)
6. Wetaskiwin	207	34	8	42 (20)
7. Banff	73	13	1	14 (19)
8. Jasper	53	10	0	10 (19)
Total in Cities	10,242	1730	537	2267 (22)

Conclusions

One conclusion seems to be that an established residence in a university city is somewhat more likely to insure that a student in the Province of Alberta will attend the University of Alberta than will residence away from such a centre. However, once this factor is taken care of, actual distance seems to make little difference.

It seems too that certain areas in the province tend to send more students, in relation to the number writing matriculation examinations, to the University of Alberta, than do other areas. We have no completed record of the numbers of high school students who leave Alberta to go to other universities.

During the past three years the Student Advisory Services has sent out questionnaires to all students who made a matriculation average of 70 percent or better but who did not register at the

TABLE V

INDIVIDUAL SCHOOLS IN EDMONTON AND CALGARY 1956 and 1957

	Grade XII matriculation examinations written in June	Freshman Enrolment at the University of Alberta in September		
		Edmonton	Calgary	Total
Edmonton:—				
Eastglen	343	64	0	64
St. Joseph's Boys	201	44	0	44
St. Joseph's Girls	194	37	1	38
St. Mary's Boys	65	6	0	6
St. Mary's Girls	48	10	0	10
Strathcona Composite	485	120	0	120
Strathcona High School	181	95	7	102
Victoria Composite	698	163	0	163
Westglen	280	105	0	105
Alberta College	378	87	0	87
Christian Training Institute	21	6	0	6
Pensionnat de l'Assomption	60	3	0	3
St. Anthony's College	46	10	0	10
Concordia College	40	3	1	4
Totals	3040	753	9	762 (25)%
Calgary:—				
Central	349	42	77	119
Crescent Heights	724	37	118	155
Western Canada	708	25	34	59
St. Mary's Boys	129	13	16	29
St. Mary's Girls	109	2	11	13
Mount Royal College	462	38	40	78
Totals	2481	157	296	453 (18)%

University of Alberta in the year in which they made that average. Questions were asked about present occupation and future plans. Those not attending a university or not enrolled in other courses of study, gave as their reasons for discontinuing formal academic work, health, finances, marriage, indecision about immediate plans for study and a general lack of interest. These answers are being analyzed and will be presented in a later report.

The present survey answers the question which was asked about distance from the university but leaves many of the other questions unanswered. It is hoped that the survey will invite others interested in this problem to form hypotheses on the basis of this information and perhaps to carry out studies to test these hypotheses.

AN INVESTIGATION OF THE INFLUENCE OF CYCLING OF SCIENCE 10 AND 20 ON ACHIEVEMENT IN CHEMISTRY 30 AND PHYSICS 30

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Statement of Problem

The Senior High School Handbook* endorses cycling as an acceptable and advantageous practice in small high schools with limited enrolments. The purpose of this study was to determine whether cycling Science 10 and 20 affects achievement in Chemistry 30 and Physics 30.

If a student is registered in Science 10 in Grade X, followed by Science 20 (presumably the more difficult course) in Grade XI, obtaining a standing of B or better, he could then enter either or both Chemistry 30 and Physics 30 in Grade XII with reasonable prospects of success. On the contrary, if he had Science 20 in Grade X he need obtain only a C standing, and he is one year away from its sequent courses, either Chemistry 30 or Physics 30. The intervening year is spent on the (presumably) easier course, Science 10 and he gets his required B standing in this. Hence this study aims to assess whether the order of cycling affects performance in Chemistry 30 and Physics 30.

Design

There were two main groups in this study, Group A, the experimental group, and Group B, the control group. Group A consisted of those students who took grade nine in 1952-53, Science 20 in 1953-54, Science 10 in 1954-55, Chemistry 30 and/or Physics 30 in 1955-56. Group B consisted of those students who took grade nine in 1953-54, Science 10 in 1954-55, Science 20 in 1955-56, Chemistry 30 and/or Physics 30 in 1956-57.

The same 104 schools provided the two groups: "A" being off-cycle, so to speak (Science 20-10 in that order), and "B" on-cycle (Science 10-20). Three requirements in selection were set:

i. Students must have taken grades nine, ten, eleven and twleve in the same school.

ii. Students must not have repeated any high school science course nor taken any high school science course by correspondence.

iii. And, obviously, students must have completed Chemistry 30 or Physics 30, or both.

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*Senior High School Handbook. (Edmonton: Department of Education, 1956), p. 41.

It was assumed that the use of the same schools in securing the two groups would tend to stabilize the influence of other factors which might affect achievement, factors such as: change of teachers, size of school, adequacy of library and science laboratory, socio-economic status, and intelligence.

The total rural population was used, making sampling unnecessary. All of these students did not take the same grade twelve subjects. Because of the possible effect of transfer of learning, it was necessary to break each of the two main groups into the eight sub-groups shown in Table I. The sub-groups were further divided on the basis of sex.

TABLE I

INITIAL SUBGROUPS AND CLASSIFICATIONS

Sub-Groups	Experimental Group A			Control Group B		
	Total	Boys	Girls	Total	Boys	Girls
1. C with MP	155	95	60	101	69	32
2. C with P, no M	41	23	18	22	16	6
3. C with M, no P	180	62	118	196	65	131
4. C, no MP	128	51	77	93	41	52
5. P with CM	155	95	60	101	69	32
6. P with C, no M	41	23	18	22	16	6
7. P with M, no C	17	13	4	18	14	4
8. P, no MC	13	10	3	5	4	1

Symbols:— C—Chemistry 30. P—Physics 30. M—Mathematics 30.

Procedures and Findings

Two precautionary measures appeared now to be required. The first was to determine if the corresponding classifications were comparable in terms of some criterion or criteria. For this purpose Grade IX general science and the Grade IX General Test were selected, the latter being in essence an intelligence test. Thus, were the Subgroup I boys of the experimental group comparable to the same classification of the control group in terms of general science and General Test scores? To compare means and other constants an analysis of variance precedure was used, and fortunately for this study all corresponding classifications proved similar

within the .01 level of significance. It was thus demonstrated that the experimental and control groups were well matched in all their sub-groups and classifications.

The second precautionary measure was to determine how well the two criteria, namely general science and the General test of Grade IX, predicted achievement in Chemistry 30 and Physics 30 of Grade XII. For this purpose a multiple correlation technique was used. The zero order correlations indicated that neither test alone was adequate for the purpose but as a team produced correlations in most instances significantly greater (at the .01 level) than zero. Computations were restricted to the four larger sub-groups of Table I (sub-groups 1, 3, 4, 5) and these in their classifications yielded twenty-four multiple correlation coefficients. Of these eight failed of significance at the .01 level, but since even these were positive it was concluded that the twenty-four classifications were sufficiently well equated to justify meaningful comparisons of Grade XII performance in Chemistry 30 and Physics 30.

Comparisons of mean achievement in Chemistry 30 and Physics 30 were then made as between corresponding classifications of control and experimental groups. Mean differences were checked by analysis of variance. Suffice it to say that of twelve comparisons not one showed a significant difference of means. The obvious conclusion is that, within this experimental design, it makes no difference in Grade XII performance in Chemistry and Physics in what order Science 10 and Science 20 are taken. In other words cycling these two courses may be an acceptable and advantageous practice in small high schools.

A REVIEW OF ENRICHMENT PROCEDURES FOR GIFTED PUPILS

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Enrichment is not an administrative arrangement but rather a teaching procedure using a variety of resources and experiences to give a new and richer meaningfulness to life. It entails the selection and organization of learning experiences aimed at the optimal development of the child. The results achieved depend not only upon the program offered but upon the sensitivity and ability of the child to achieve greater and deeper understanding. Goddard (4) stated that preparation for adult life is not particularly shortened by superior intelligence and that enrichment is more important. Scheifele (15) says "differentiation of the curriculum for the gifted lies not so much in the kind of experiences provided as in their variety, depth and advanced level." Gossard, checking the relevant literature from 1870 to 1940, found enrichment more popular than acceleration, and Wolfson, on the basis of class observation, agrees that enrichment better meets the needs of gifted children (12). The White House Conference (12) in 1930 expressed the same view and the Educational Policies Commission stated in 1950:

> The typical gifted child by his very nature tends to get more out of school than the typical average child . . . through deeper insights, broader understandings, keener appreciations, and more memories. Thus life for the gifted tends to be enriched merely by the living of it and any life experience within the school enriches the gifted more than the average (3).

Unplanned enrichment tends, however, to be a half-measure. While many argue that the child is self-motivated, and that only guidance is needed for his development, there is still wide agreement that systematic efforts must be made if appreciable enrichment is to be achieved. Opinion varies on the use of regular classes as against special classes segregated on a partial or full time basis.

Enrichment in Regular Classes

Those proposing enrichment for gifted students in heterogeneous classes maintain that education applies to individuals and not to groups. Such enrichment involves differentiation of subject material and activities. It implies modifying techniques for individual instruction such as adjusting the types of assignments, the directions given to the gifted, and the modification of teaching procedure pertaining to drill, formal review, illustrations, reports, and the principles concerned. Bentley remarks that enrichment should mean

a deepening of the learning process, not just an addition of material. Many writers caution against anticipating the course content of succeeding grades. Goddard (4) indicates that enrichment depends largely upon the resourcefulness of the teacher in using dramatics, field trips, visual aids, French, wide reading interests, and activities in music, art, manual training, and type-writing. Correspondence courses and extra-curricular activities are proposed for enrichment as well as elective courses which apply largely to high schools and colleges. Scheifele (15) admits that enrichment might be more easily effected in a special classroom but from a practical standpoint it is not easy to provide special classes except in large centres. She outlines many enrichment activities under the headings of School and Community-Service activities: activities integrated with group projects, independent activities, and creative activities. Adequate materials, small classes, flexible curricula, and time for the teacher to plan, are all factors in the success of enrichment procedures in the regular classroom. Hollingworth (8) has stressed the gifted child's need for understanding the history of human progress because she is insistent upon the leadership role that the gifted will play in society. Procedures most favored are unit method seminars, field trips, parent-teacher conferences, research projects, socialized recitations, individual instruction, study of French, literature, and biography, and education for the use of leisure time. Dramatics, language arts, debates, and clubs are also mentioned. Gross (6) too, points out that in the regular classroom there are examples of gifted children preparing units of work, community surveys, class projects, school magazines, and displays. While such a program may be geared to the abilities of the gifted, it may include emphasis upon the basic education essential for the average pupils as well.

Auburn speaks of enrichment in the regular classroom as the most widely accepted method. Parker and Russell (13) say that dividing classes into smaller groups may be justified for reading and social studies in the elementary grades but that grouping must be flexible to accommodate the wide range of abilities. They go on to assert that there is no basis for any particular grouping and that "the more detailed studies of children seem to suggest that homogeneous grouping of two children is impossible, much less that of thirty or thirty-five youngsters." The Hope Report (9) favors extra courses for enrichment and indicates that "pupils should be classified at each level of the program according to needs, abilities, and achievements." The Educational Policies Commission recognizes the idea of ability grouping in the regular classroom and also recognizes the claim that the brighter pupils stimulate the slower ones. Nevertheless there is danger that the slower ones may

become discouraged and their opportunities for class participation lessened. Scheifele emphasizes the social values inherent in heterogeneous grouping and the Connecticut Committee also remarks that the school is a replica of the community and that in regular classrooms bright pupils may learn to communicate and cooperate with those who think less rapidly and less creatively and may stimulate them to a higher level of learning.

Enrichment in the regular classroom involves individual attention and special activities for a very small number. Publications such as those of the Office of Education, the Texas University Workshop, Scheifele's Bulletin, and many others describe techniques for enrichment such as collections, science projects, reference reading, pupil demonstrations, contests, mathematical puzzles, challenging questions, flexible timetables. They make numerous other suggestions. Other writers endorse the enrichment procedures that are made possible through the use of community resources, adequate materials, special interest groups, and extensive reading. Stedman (16) notes that the reading interests of the gifted make it easy to carry on enrichment programs. Barbe (1) insists that gifted children need reading material of a high-interest level and that reading instruction is necessary.

Pritchard interposes reservations. He reminds us that enrichment in the regular classroom implies small enrolments and sufficient teacher time for the careful planning necessary for the development of essential skills and creativity commensurate with pupil ability. Rideout (14) asserts that mass education, with large classes, wide range of ability, and heavy teacher-load make such planning impossible. If teaching is geared to individual differences then the gifted child's program may be enriched. But the average teacher has neither the time, knowledge, nor limited enrolment to carry out the program. The New York Committee (2) states that it has been almost impossible to meet the special needs of the gifted in heterogeneous classes because the group is large, the range of intelligence is wide, and the teachers seldom have special qualifications for the task. Terman and Oden (18) say that the subject matter of the regular classroom is not challenging to the gifted and "that enormous differences separate the achievement scores of the gifted from those of unselected children." And Witty (19) says, "the gifted child is offered little that is challenging in the typical elementary school and the neglect is even greater in the secondary school."

Despite frequent claims of successful enrichment programs in regular classrooms, operational techniques are rarely published. Perhaps Rideout is not far from the truth when he writes,

> To a large extent research studies have shown that enrichment of the program within the regular classroom has not been too successful except in the case of outstanding teachers.

Enrichment Through Partial Segregation

Since partial segregation centers attention on the welfare of the individual without losing sight of the democratic ideal, it provides opportunity for the children of such classes to participate with other children in clubs, assemblies, and other school projects. Such classes are usually smaller and it may be easier to get a teacher qualified for the special area being emphasized. It prevents waste of time in the mastery of basic skills and makes possible the development of a challenging program. Special interest classes or honors classes may provide for more rapid progress although it is usually claimed that their major emphasis is on provision of opportunities for broadening and deepening educational pursuits rather than acceleration.

Accelerated Enrichment

It is claimed that acceleration and enrichment cannot be treated as a dichotomy. Terman refers to the process of acceleration and enrichment and both Meister and Freeman point out that even in a regular classroom the able teacher provides enrichment with acceleration. Enriched acceleration obtains when a class of high ability learns more rapidly and more deeply. Stedman (16) asserts that enrichment should be characterized by curriculum adjustment which shortens the time for drill and detailed explanation so that teaching time may be only two-thirds of what is needed for regular classrooms. Schiefele (15) indicates that programs of acceleration and enrichment combined in the regular classroom seem best suited to serve the welfare of the gifted. Witty (20) notes that since the war there are more attempts to provide acceleration and enrichment and that many systems report improvement in adjustment and progress. He adds that:

> One half of our gifted children live in small communities where establishment of special classes is impractical. In fact it appears there are very few special classes in the country for elementary school. So we depend on acceleration and enrichment in the regular classroom and much depends on the effort and resourcefulness of the teacher.

Laycock (10) writes that while acceleration is usually easier in a rural than in an urban school nevertheless there is great opportunity for enrichment there also. Most people who urge acceleration think it should be accompanied by enrichment. The Connecticut Committee supports this view. It appears generally agreed that in the final analysis there is no conflict between enrichment and acceleration. They complement each other in the best educational program for the gifted child.

Ability Grouping

Ability grouping is a procedure for bringing the brightest pupils together for part or for all of their time. Special schools, schools within schools, special classes, or ability groups within the regular classroom are examples of attempts at homegeneous grouping to provide for enrichment or for acceleration or for both.

Sumption, Norris, and Terman recommend the organization of special classes wherever possible. On the other hand the Hope Report (9) asserts:

> We are not fully convinced despite the evidence of some experts, that highly gifted children should be separated from their fellows and educated in special classes.

It would appear that recognition is not universal that the gifted represent a group deserving of special attention comparable to that given to groups in the lower range of mental abilities. Scheifele (15) says there "is nothing so unequal as the equal treatment of unequals". Yet Hildreth and others state that a program specially adapted for the gifted can be developed in special classes. Rideout (14) refers to the findings of Lamson, Burnside, and Hollingworth to the effect that the advantages of special classes outweigh the disadvantages. Carroll adds his support and states that special classes actually discourage the development of snobbishness. Heck (7) reports that New York's experience indicates that gifted pupils participate much more extensively in out-of-class activities than do other students. He quotes Moskowitz as saying that the program for the gifted "creates an atmosphere, a climate of further encouragement and enrichment that cannot fail to stimulate others to strive for higher standards of achievement". He further notes that such children do not develop habits of slothfulness and are able to work at the level of their superior ability where instruction, materials, and programs are adapted to their needs in a challenging manner.

Practices in Ability Grouping

In the United States

A number of surveys have been made to determine the extent of special provision for gifted children. In 1952, the Secondary Office Section of the Office of Education made such a survey and from 850 replies it appeared that nearly half the schools reported attempts to place pupils in ability groups, largely with a view to establishing college preparatory courses. Gossard (12), after a study of ten cities, indicated that while intra-class grouping had been a practice for a long time the special class procedure was gaining favor. Witty (19) reports a number of Ohio centers with special classes in junior and senior high schools; Bellaire had a three-group system; Newark reported special courses as electives; Sandusky had an enriched

program for the upper twenty per cent of Grades seven to ten pupils; Cinncinnati reported special college preparatory work in the senior grades; and Cleveland had special classes throughout the system.

In New York a survey report (2) in 1952 indicated there were about 23,000 elementary children with I.Q. above 130. However it appears there were only forty-five classes of partially segregated pupils in an elementary school population of over one-half a million. In the high schools there were a number of specialized schools such as the Bronx High School of Science, The Brooklyn Technical School, and the High School of Music and Art. For admission students required high intelligence, good scholastic standing, and high interest and achievement in a special field. In large schools, honor classes for superior pupils were established within the school. In other schools honor classes were formed for ability grouping in particular subjects. This is a common practice in many of the high schools throughout the country. Chicago and Phoenix have such classes which have attracted wide attention. In other eastern states a number of centers have established special classes.

These are but samples of efforts under way in the United States to solve at least some of the educational problems associated with superior and gifted pupils.

In Canada

Ability grouping is evident in various centers throughout Canada. The Highlands School of Edmonton has five rooms each of Grades VII, VIII and IX from each of which are chosen the top five pupils to make a special class of twenty-five in each grade. It is reported that an enrichment program in these special classes has resulted in better pupil reports, better teaching, and improved achievement. It is also reported that two high schools in Edmonton have homogeneous grouping in Grade X. British Columbia reports that in 178 schools gifted pupils are assigned to one class that might contain two or more grades. In 1954 Winnipeg established three special classes known as Major Work Classes for gifted pupils above grade three. The pupils are not isolated from others for such school activities as music, physical education, or sports. Since 1956 homogeneous grouping has found favor in New Brunswick and in one school with rooms of two grades each, a teacher taught the select pupils of Grades I and II one year and the next year the same pupils in Grades II and III. Several centers in Ontario have attempted part time or full time grouping. In Ottawa there are two special enrichment classes in Grade V composed of pupils from various parts of the city. In schools having four or five rooms of the same grade, the superior pupils are placed in one class. At Upper Canada College

superior pupils who finish Grade VIII at a younger age than twelve years go into a special Grade IX class or even into a special group doing Grade X work. In Toronto special interest groups of Grade V and VI pupils meet for an hour each week. Grouping is also established for high achievers in the secondary schools for some special subjects. In the elementary school a special provision exists for high achievers, particularly of foreign parentage. Pupils of this type who have not qualified by a rating of 130 I.Q. are individually interviewed and considered for segregated classes. In London a special class is formed of those Grade IX students with high I.Q. standings who have been rated outstanding by their elementary school principals. This class was formed in 1954 and in its second year had completed the work of Grades IX and X and made a start on the Grade XI program. Since 1928 London has had special classes beginning at grade five to give enrichment to pupils of high I.Q. who have spent three years in Grade I-IV. In Saskatoon special classes were organized in 1932 on the recommendation of Dr. C. Oulton who worked with Dr. S. R. Laycock in their organization. In September, 1956, it was decided to recruit pupils for special classes at the grade five level only and these children will continue with the same teacher for four years to the end of grade eight. Some provision is made for them to finish the four grades in three years if they have not been previously accelerated.

In Other Countries

Not only in Canada and United States, but in some other countries ability grouping has been in practice. In Germany there have been special classes in many centers for gifted pupils since before the First World War. For example in 1918, in Breslau, children of high intelligence approximately twelve years of age were admitted on the basis of mental tests and teachers' recommendations to two special classes, one for boys and one for girls. England's grammar schools still retain their reputation for selectivism in admitting pupils. In Australia, New South Wales has operated special classes known as Opportunity Classes since 1932. There are now thirty-two Opportunity Classes operating in Grades V and VI, the last two years of the Primary School.

Conclusions

It is fairly obvious that there is no unanimity regarding what should be done for the gifted. Grant remarks that at the First International Workshop on Education held at Syracuse University in 1955, an inconclusive discussion centered on the problem. Krueger points out there is not yet sufficient evidence to warrant unqualified endorsement of any single solution.

Nevertheless the literature abounds with descriptions of commendable practices where educators, actively concerned about the needs of the gifted, are offering challenging programs to the superior pupils. It would appear that administrative organization, curriculum adjustment, preparation of suitable teachers and counsellors, and the modification of teaching procedures will require constant consideration and well organized experimentation before stable conclusions can be drawn.

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